MODE CHOICE ANALYSIS IN SUBURBS OF KENDARI CITY

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ABSTRACT

Kendari city is the capital of Southeast Sulawesi province that experienced an increase in population growth and economic activity is quite large, so the impact on meeting the needs of large as well, where the demand was not met but where he was met elsewhere. As well as the community of Puwatu District and Kendari District located in Kendari City Suburbs, there People need a mode of transportation to get to their destination. This will have an impact on congestion on road segments in Kendari. This study aims to determine the characteristics of Population trip, find out the factors that influence the selection of modes, as well as get modal choice models to examine the variables that affect the modal choice to destinations in order to anticipate the problems of traffic congestion occurring in the future.

Primary data were collected through questionnaires in 98 respondents in each Puuwatu District and Kendari District. Results of the questionnaires were tabulated into independent variables and the dependent variable, and multiple linear regression analysis using SPSS-16. From the analysis of the characteristics of the respondents trip Kendari suburb is dominated by men, the number of members of his family in a house that is 3 until 6 people. Judging from the level of education dominated College Graduate School / High School or equivalent. In one arrangement of the household, the family members who work in the domination by two people. Self-employed and civil servants constitute the largest proportion of respondents who earn the kind of work one million until 3 million per month. In the process of accessibility to the place of their work, the most used mode of transport is a motorbike. Timely is the biggest reason respondents choose the mode of transport used. By Destinations working has the largest proportion. Respondents only travel < 3 times a day, and based on the distance to the destination > 5 km. Costs incurred for transportation per month ie < Rp.500.000, -. From a series of statistical tests showed that the factors that affect the modal choice in District Kendari is Time Travel (X_1), Travel Expenses (X_2), Mileage (X_3), and Congestion (X_5), the regression model, $Y = 0.569 + 2.0295 X_1 + 0.170 X_2 + 0.242 X_3 + 0.190 X_5$. As for the District Puuwatu factors affecting modal choice is Time Travel (X_1), Travel Expenses (X_2), Mileage (X_3), Congestion (X_5), and Route Travel (X_7), the regression model, $Y = 0.167 + 0.166 X_1 + 0.325 X_2 + 0.197 X3 + 0.111 X_5 + 0.163 X_7$.

KEYWORDS: Regression, Analysis, Selection Mode, Suburbs, District, Congestion

INTRODUCTION

Preliminary

Background

Transportation arise in human life because of the fulfillment process where needs are not met where he was but the fulfillment elsewhere. Because of these reasons make the movement happen between the two places, namely the place where the goods or services needed to the place where the goods or services provided.

The movement that occurs due to the process of fulfilling this requirement can occur at a certain time like every day, every hour, every minute, and every second. There are various types of fulfillment as the movement for

the fulfillment of work, recreation and others. Forms of these activities will determine the type of movement patterns occurring in a region where the movement of individuals in a zone will be different from other zones which will be very much influenced by the characteristics of the individual characteristics of the offender movement / travel within the region.

City of Kendari, the capital of Southeast Sulawesi province, which has an area of 267.37 km2 with a population growth rate of 3.039% in the last 3 years and the increasing economic activities. Kendari city began to manifest themselves as a growing city that has a transport system problems, such as congestion. Selection of modes of transport is one contributing factor, if the community prefers receipts of private vehicles on public transportation, of course it will make the streets are full of private vehicles, causing traffic jams. It is necessary for the data to determine the factors that affect someone modal choice both in terms of the characteristics of the traveler, characteristics journey, and the characteristics of the transport system. Of these factors are then able to provide a clear picture of the behavior of one's journey.

The phenomenon that appears in large cities today as well as the city of Kendari is for the traveler who were mostly traveling is done routinely every day to get to a particular destination. So congestion often occurs in the morning and in the afternoon, this is caused by the movement of travelers going on at the same time. Of travelers tend to stay in the suburbs (Hinterland) and headed to the city center. In the morning they flocked away toward the center of the city and in the afternoon they go back to their homes in the Hinterland. Therefore, it is very possible congestion at peak times like in the morning and in the afternoon.

Subdistrict Puuwatu as one of the districts in Kendari city geographically located in the outskirts of the city with an area of 39.72 km2 and is the district population is 30 061 inhabitants and ranks first among the districts that were in the suburbs, according The Central Statistics Agency Kendari. Although the growth of population and economy that is developing, exploiting its land use is not only intended for residential areas but also in the area designated for offices, trade and commercial services, various industries, as well as educational facilities. But the presence of these facilities do not ensure that the activities of residents in the district puuwatu only centered on the region. As well as other things that become support in their activities. Thus allowing them to move out of puuwatu districts to the city center.

For Kendari District of geographically located in the inner city area with an area of 15.68 km2 and is a district that the number of population is second largest after the District Puuwatu with a population of 27,686 inhabitants. Subdistrict Kendari that region or area that used to be the center or the center of the city of Kendari. Now the region has begun to quiet as a shift towards the city center Mandonga, Wuawua and Poasia. This causes the movement of residents in the District Kendari tends to vary due to differences in transportation route from the location of residence to the city center.

Research Objectives

The purpose of this study are:

- Analyzing the characteristics of the traveling population in the suburbs Kendari
- Analyze the factors that influence the selection of modes of transport in the suburbs Kendari.
- To get the modal choice models in the suburb Kendari

LITERATURE REVIEW

According Tamin (2000) model is a tool or media that can be used to reflect and simplify a reality (the real world) is measured or simplification of reality to obtain the specific purpose of explanation and deeper understanding as well as

for the benefit of forecasting. More and more like a model with reality, the more difficult to make the model. So, modeling is the quantitative approach will be undertaken to get an explanation or a clearer picture as well as measurable on the transport system.

Modal choice is usually used to determine how the traveler choose the mode to be used, in other words modal choice can be defined as a division of the number of trips to the manner or mode of travel is different. This stage can determine the factors that influence the selection of a particular mode of transportation for the trip.

There are two options that can be used by users of the road between the movable and immovable. If elections do move it will be election mode of transportation and walk, then when selecting modes of wear, it is required to choose two options namely the use of public transport or private transport as a process in Figure 1.
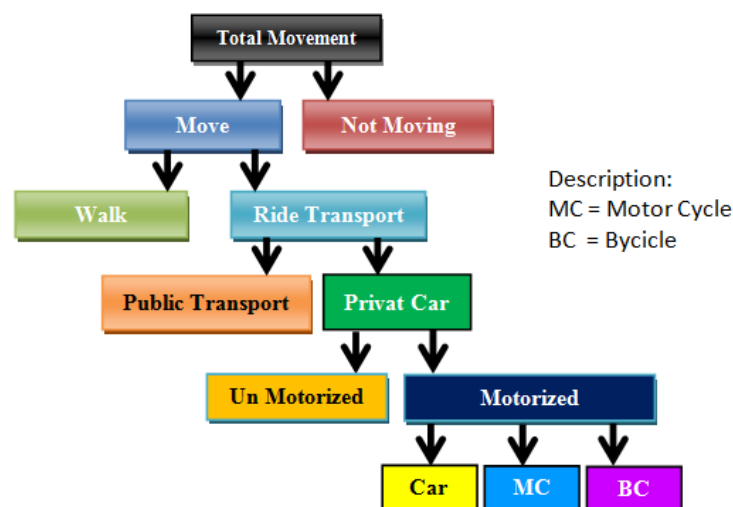
Figure 1: Mode Choice Process

Selection of alternative routes affected by the shortest, fastest, cheapest. It is assumed that road users have enough information (eg about traffic jams), so that they can choose a good route. Traffic flow interacts with the transportation system, thus affecting the performance of a road. In this case the amount of traffic flow effect on travel time.

Suburban areas (Urban Fringe) is defined as the suburban area is in the process of transition from rural areas into urban areas. As the transition area, this area was under pressure of urban activities that increase the impact on physical changes, including the conversion of agricultural and non-agricultural land with a variety of effects.

Muhlisin (2003) has defined the suburban areas as follows:

- Areas where land use and rural and urban meet urgent in the periphery of the city.

- A region that is located located near the border city official, but still within driving (commuting distance).

- Areas near the city whose population is oriented to the city (Urban oriented resident).

- An open rural areas inhabited by people who work in the City.

- An area meeting place of people who require life in the city and in the village.

RESEARCH METHODS

Research Location

Location of the research conducted on two zones namely Zone suburb north to the District Kendari and the West Zone to the District Puuwatu, Kendari, Southeast Sulawesi Province. Both zones have been selected as the study site with the consideration that the second zone has the largest population compared to the other zones so as to facilitate the process of analyzing.
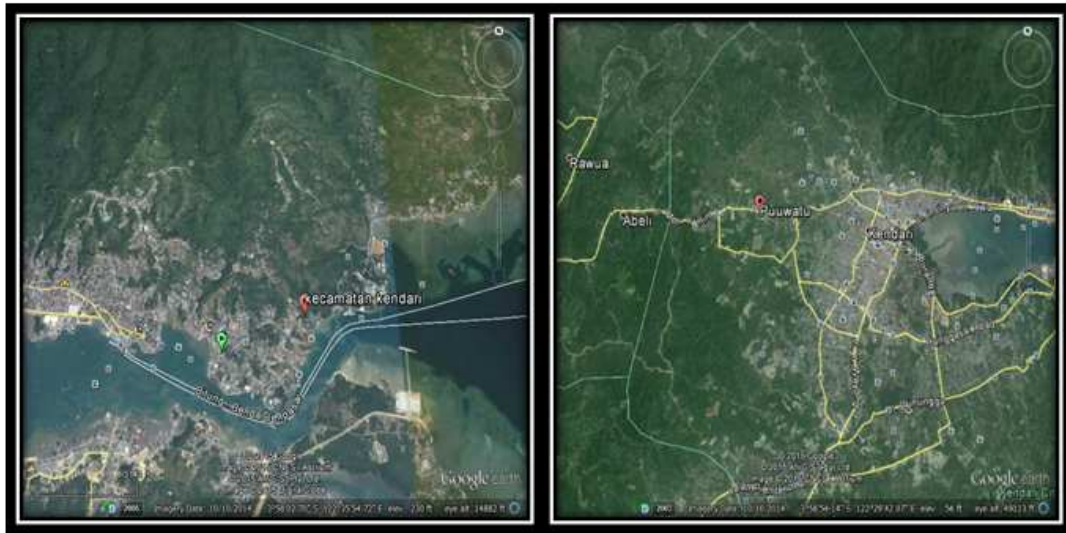
Figure 2: Location of this Research at District Kendari and District Puuwatu

Research Time

This research will be carried out for 1 (one) week in the month of February 2015 until the completion by distributing questionnaires to people in the district and subdistrict Puuwatu Kendari.

Method of Collecting Data

Data used in the study were secondary data and primary data. Primary data obtained by distributing questionnaires at random and interviews to members of the public who live in the district Kendari and district Puuwatu with appropriate questions questionnaire format, where one respondent representing one family living in one housing unit.

Population and Sample

The population in this study is the Kendari District residents and the District Puuwatu. Based on data from the Central Statistics Agency Kendari that number Puuwatu the District population is 30 061 inhabitants, while the total population is 27,686 inhabitants District of Kendari.

To Calculate the minimum size of the sample used in the method of sampling using Slovin formula, namely: (Yamane, 1967)

$$n = \frac{N}{1 + N.e^2}$$

Where :
n   = amount of sample
N   = Large Population
E   = the percentage of non-kelongggaran carefully situations (precision) due to
          sampling error that can be tolerated or desirable (10%).

Total population in this case considered is the number of families who are in District Puuwatu are 6390 head of family while the District Kendari Head of the Family are 6782. Total number of samples for the District Puuwatu are 98 samples, and total samples for District Kendari are 98.

Variables

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Dependent Variable (Y)       : Mode Choice
Independent Variables        :

        X1    : Travel Time        X2: Travel Cost
        X3    : Mileage            X4: Pavement Condition
        X5    : Congestion         X6: Traffic Sign
        X7    : Route
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RESULTSAND DISCUSSIONS

The Characteristics of Respondent

Characteristics of respondents at Kendari suburb dominated by men, the number of members of his family in a house that is 3-6 people. Judging from the level of education dominated College graduate high school / high school equivalent.

In one arrangement of the household, the family members who work in the domination by 2 people. Self-employed and civil servants constitute the largest proportion of respondents who earn the kind of work 1 million - 3 million per month. In the process of accessibility to the place of their work, the most used mode of transport is a motorbike.

Timely is the biggest reason respondents choose the mode of transport used, with Destinations working has the largest proportion. Respondents simply traveling less than 3 times a day, and based on the distance to the destination of more than 5 km. Costs incurred for transportation per month is less than 500,000, -IDR

Travel Patterns Characteristics Population Based Selection Mode of Transportation In District Kendari

Table 1: Mode Choice in District Kendari

No	Mode Choice	Respondent (Person)	Percentage (%)
1	Motor Cycle	68	69.39
2	Privat Car	4	4.08
3	Public Transportation	20	20.41
4	Other Vehicles	6	6.12
	Total	**98**	**100.00**

On the table it can be seen that most of the Kendari District residents prefer to utilize a personal vehicle types of motorcycles. This is evidenced by the large number of respondents who use motorcycles by 69.39%, which use public transport as much as 20.41%, private car types 4.08% and the use of other types of transportation modes is only about 6.12%.

Travel Patterns Characteristics Population Based Selection Mode of Transportation in District Puuwatu

Table 2: Mode Choice in District Kendari

No	Mode Choice	Respondent (Person)	Percentage (%)
1	Motor Cycle	71	72.45
2	Privat Car	19	19.39
3	Public Transportation	5	5.10
4	Other Vehicles	3	3.06
	Total	**98**	**100.00**

Similarly, the District of Kendari, the domination trip of Puuwatu districts also performed by using the motor cycle (72.45%), but in districts Puwatu use of private vehicles (19.39%) is greater than the District of Kendari (4.08%), in addition to the use of public transport in the district Puuwatu (5.10%) less when compared with Subdistrict Kendari (20.41%).

Mode Choice Regression Model in District Kendari

After doing some testing process, the obtained results of multiple linear regression are presented in the following table 3.

Table 3: Mode Choice Regression Model in District Kendari

No	Variable	Model Parameter	Coefisien	t	Significan
1	Y	a	0.569	2.306	0.023
2	X1	b1	0.295	5.680	0.000
3	X2	b2	0.170	3.140	0.002
4	X3	b3	0.242	4.291	0.000
5	X5	b5	0.190	3.373	0.001

Regression Model

$$Y = 0.569 + 0.295\ X_1 + 0.170\ X_2 + 0.242\ X_3 + 0.190\ X_5$$

Regression Model Indicator:

R = 0.789

R^2 = 0.622

F = 38.26

Sig.F = 0.000

Mode Choice Regression Model In District Puuwatu

Table 4: Mode Choice Regression Model in District Puuwatu

No	Variable	Model Parameter	Coefisien	t	Significant
1	Y	a	0.167	0.762	0.448
2	X1	b1	0.166	3.798	0.000
3	X2	b2	0.325	6.749	0.000
4	X3	b3	0.197	5.294	0.000
5	X5	b5	0.111	2.910	0.005
6	X7	b7	0.163	4.443	0.000

Regression Model

$$Y = 0.167 + 0.166\ X_1 + 0.325\ X_2 + 0.197\ X_3 + 0.111\ X_5 + 0.163\ X_7$$

Regression Model Indicator:

R = 0.866

R^2 = 0.750

F = 55.245

Sig.F = 0.000

Seven factors are available on the questionnaire that Time Travel (X1), Travel Cost (X2), Mileage (X3), Pavement Condition (X4), Road Congestion (X5), Traffic Signs (X6), and Route Journey (X7).

From the survey results and analysis, for the District of Kendari factors that most influence the modal choice is Time Travel (X1), Travel Cost (X2), Mileage (X3), and Congestion (X5).

The District Puuwatu the factors that most influence the modal choice is Time Travel (X1), Travel Costs (X2), mileage (X3), Congestion (X5), and Route journey (X7).

There are four pieces of the same factors that influence the choice of a person to transport that will be used to the location of their activities on both districts, the travel time (X1), travel expenses (X2), trip distance (X3), and traffic (X5), but on Puuwatu districts there is a another variable that is not contained in Kendari districts, namely the route variables (X7). This can be explained that in the two districts located at the East end (the District Puwatu) and the tip of the North (District of Kendari) have characteristics different route. In the District of Kendari there is only one route that connects this district with the city center, while in the District Puwatu there are two route options that can be taken by the user mode, so that was why, during districts Puwatu this factor becomes significant in influencing the choice of a person to the mode to be used with the aim to more quickly arrive at the intended location.

CONCLUSIONS

- Respondents in both the suburban region of respondents District of Kendari and the District responnden Puuwatu have nearly the same variables that travel time (X1), travel expenses (X2), trip distance (X3) and traffic (X5) in determining the choice of modes transport to be used during activity.

- In the District of Kendari there is only one choice of routes of travel to perform activities, while at the District Puuwatu have alternative routes to be used with the aim to be faster to their destination, so that the choice variables (X7) is one of the variables that determines the choice of the mode of transport in this suburban area.

- Mode Choice Regression Model in District Puuwatu:

$$Y = 0.167 + 0.166 X_1 + 0.325 X_2 + 0.197 X_3 + 0.111 X_5 + 0.163 X_7$$

Mode Choice Regression Model in District Kendari:

$$Y = 0.569 + 0.295 X_1 + 0.170 X_2 + 0.242 X_3 + 0.190 X_5$$

Further Research

- The variables studied only includes seven variables, it is recommended for subsequent researchers can examine the other parameters related on modal choice in addition to the parameters that I use ..

- Given the limitations in data collection, namely the survey questionnaire, in which the seriousness and focus of each respondent kuisisoner charging different then expected for the next researcher conducting similar research with this study also pay attention to it.

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